4.3.5.1.4 *Water Resources*

The construction and operation of a MOX fuel fabrication facility would affect water resources. Water resource requirements and discharges provided in Tables C.1.1.2–3 and C.2.1.2–3 and Table E.3.2.3–1, were used to assess impacts to surface and groundwater. The discussion of impacts is provided for each site separately. Table 4.3.5.1.4–1 presents No Action surface and groundwater uses and discharges at each site, and the potential changes resulting from construction and operation of a MOX fuel fabrication facility.

Hanford Site

Surface Water. Surface water from the Columbia River would be used as the water source for construction and operation of the MOX fuel fabrication facility. During construction, the quantity of water required would be approximately 1.9 million l/yr (0.5 million gal/yr), which would represent a 0.01-percent increase over the projected annual surface water withdrawal. During operation, the total annual water requirement for the facility would be approximately 56.8 million l/yr (15 million gal/yr), which would represent a 0.4-percent increase over the existing surface water withdrawal and approximately 0.00005 percent of the annual average flow rate of the Columbia River (3,360 m^3/s [118,642 ft^3/s]). These additional withdrawals would have minimal affects on surface water availability.

[Text deleted.]

During construction of the MOX fuel fabrication facility, sanitary and other nonhazardous wastewater (1.9 million l/yr [0.5 million gal/yr]) would be generated and discharged to an existing wastewater treatment system. During operation, approximately 43.5 million l/yr (11.5 million gal/yr) of sanitary and other wastewater would be discharged to this wastewater treatment system. This would represent a 17.7-percent increase in the wastewater discharged annually at Hanford. All discharges would be monitored to comply with discharge requirements. Negligible impacts are expected.

Water from heating the facility would be recycled to the heating unit. Steam plant blowdown would be discharged through the sanitary wastewater system. Steam condensate from heating, condensation from air conditioning, and other distillates would be collected, monitored for radioactivity, and, if uncontaminated, discharged to evaporation/infiltration ponds or to local drainage channels. Fire sprinkler water and truck hosedown water would be collected, monitored, sampled, and treated as process wastewater, when required. It would be monitored for radioactivity and, if uncontaminated, discharged to evaporation/infiltration ponds or to local drainage channels.

The MOX fuel fabrication facility would be located outside of the Columbia River floodplain and the area of the probable maximum flood. The maximum probable flood is greater than the 500-year flood.

Groundwater. No groundwater would be used during construction or operation of the MOX fuel fabrication facility; therefore, there would be no impacts to groundwater availability. No wastewater would be discharged directly to groundwater; therefore, groundwater quality should not be affected. Treated wastewater discharged to evaporation/infiltration ponds that does not evaporate, however, would percolate downward toward the groundwater. This wastewater would be monitored and would not be discharged until contaminant levels are within the limits specified. Impacts to groundwater quality are therefore not expected. In addition, other factors contributing to a lessening of potential impacts to groundwater are the combined effects of a deep water table, low discharge volumes, and high evaporation rates.

Table 4.3.5.1.4–1. Potential Changes to Water Resources Resulting From the Mixed Oxide Fuel Fabrication Facility

Affected Resource Indicator	Hanford	NTS	INEL	Pantex	ORR	SRS	Generic
Water Source	Surface	Ground	Ground	Ground	Surface	Ground	Ground
No Action water requirements (million l/yr)	13,511	2,400	7,570	249	14,760	13,247	0
No Action wastewater discharge (million l/yr)	246	82	540	141	2,277	700	0
Construction							
Water Availability and Use							
Total water requirement (million l/yr)	1.9	1.9	1.9	1.9	1.9	1.9	1.9
Percent increase in projected water use[a]	0.01	0.08	0.03	0.8	0.01	0.01	NA
Water Quality							
Total wastewater discharge (million l/yr)	1.9	1.9	1.9	1.9	1.9	1.9	1.9
Percent change in wastewater discharge[b]	0.8	2.3	0.4	1.3	0.08	0.3	NA
Percent change in streamflow	neg	NA	NA	NA	0.004[c]	0.04[d]	NA
Operation							
Water Availability and Use							
Total water requirement (million l/yr)	56.8	56.8	56.8	56.8	56.8	56.8	56.8
Percent increase in projected water use[e]	0.4	2.4	0.8	5.1	0.4	0.4	NA
Water Quality							
Total wastewater discharge (million l/yr)	43.5	43.5	43.5	43.5	43.5	43.5	43.5
Percent change in wastewater discharge[f]	17.7	53	8.1	30.9	1.9	6.2	NA
Percent change in streamflow	neg	NA	NA	NA	0.02[c]	0.9[d]	NA

Table 4.3.5.1.4–1. Potential Changes to Water Resources Resulting From the Mixed Oxide Fuel Fabrication Facility—Continued

Affected Resource Indicator	Hanford	NTS	INEL	Pantex	ORR	SRS	Generic
Floodplain							
Is actions in 100-year floodplain?	No	No	No	No	No	No	No
Is critical action in 500-year floodplain?	No	Uncertain	Uncertain	No	No	Uncertain	Uncertain

[a] Percent increases in water requirements during construction MOX fuel fabrication facility are calculated by dividing water requirements for the facility (1.9 million l/yr) with that for No Action water requirements each site: Hanford (13,511 million l/yr), NTS (2,400 million l/yr), INEL (7,570 million l/yr), Pantex (249 million l/yr), ORR (14,760 million l/yr), SRS (13,247 million l/yr), and generic site (0 million l/yr).

[b] Percent changes in wastewater discharged during construction for the MOX fuel fabrication facility are calculated by dividing wastewater discharges for the facility (1.9 million l/yr) with that for No Action discharges at each site: Hanford (246 million l/yr), NTS (82 million l/yr), INEL (540 million l/yr), Pantex (141 million l/yr), ORR (2,277 million l/yr), SRS (700 million l/yr), and generic site (0 million l/yr).

[c] Percent changes in stream flow from wastewater discharges are calculated from the average flow of Clinch River (132 m^3/s) and East Fork Poplar Creek (1.5 m^3/s). The comparison for the East Fork Poplar Creek is shown in the table.

[d] Percent changes in stream flow from wastewater discharge are calculated from the minimum flow of the Fourmile Branch (0.16 m^3/s).

[e] Percent increases in water requirements during operation of the MOX fuel fabrication facility are calculated by dividing water requirements for the Facility (56.8 million l/yr) with that for No Action water requirements at each site: Hanford (13,511 million l/yr), NTS (2,400 million l/yr), INEL (7,570 million l/yr), Pantex (249 million l/yr), ORR (14,760 million l/yr), SRS (13,247 million l/yr), and generic site (0 million l/yr).

[f] Percent changes in wastewater discharged during operation of the MOX fuel fabrication facility are calculated by dividing wastewater discharges for the facility (43.5 million l/yr) with that for No Action discharges at each site: Hanford (246 million l/yr), NTS (82 million l/yr), INEL (540 million l/yr), Pantex (141 million l/yr), ORR (2,277 million l/yr), SRS (700 million l/yr), and generic site (0 million l/yr).

Note: NA=not applicable; neg=negligible. Construction impacts are considered to be temporary, lasting only throughout the construction period. Impacts from operations would occur continuously.

Source: HF 1991a:1; INEL 1995a:1; LANL 1996d; NTS 1993a:4; OR LMES 1995e; PX 1995a:1; SRS 1995a:2.

Nevada Test Site

Surface Water. No surface water would be withdrawn for any construction or operation activities associated with any of the proposed facilities; groundwater would be used as the water source for the MOX fuel fabrication facility. Therefore, there would be no impacts to surface water availability.

[Text deleted.]

During construction of the MOX fuel fabrication facility, sanitary wastewater (1.9 million l/yr [0.5 million gal/yr]) would be generated. During operation, a maximum of approximately 43.5 million l/yr (11.5 million gal/yr) of sanitary and other wastewater would be discharged to a new wastewater treatment system. After treatment, all wastewater generated during construction and operation would be available for recycle.

Water from heating the facility would be recycled to the heating unit. Steam plant blowdown would be discharged through the sanitary wastewater system. Steam condensate from heating, condensation from air conditioning, and other distillates would be monitored for radioactivity and, if uncontaminated, recycled or discharged to natural drainage channels. Fire sprinkler water and truck hosedown water would be collected, monitored, sampled, and treated as process wastewater, when required. It would be monitored for radioactivity and, if uncontaminated, discharged to natural drainage channels or be available to recycle.

No studies have been conducted to assess the 500-year floodplain boundaries at NTS. An assessment of the 500-year floodplain at NTS could be developed in future environmental studies. Studies of the 100-year floodplain have shown it to be confined to the Jackass Flats and Frenchman Lake areas. The proposed site for the MOX fuel fabrication facility is not located in either of these areas. However, since the NTS is in a region where most flooding occurs from locally intense thunderstorms that can create brief (less than 6 hours) flash floods, the facilities would be designed to withstand such flooding.

Groundwater. All water required for construction and operation would be supplied from groundwater. Annual construction water requirements for the facilities (1.9 million l/yr [0.5 million gal/yr]) represent approximately 0.005 percent of the minimum estimated annual recharge (38 billion l/yr [10 billion gal/yr]) to the regional aquifer under NTS. As shown in Table 4.3.5.1.4–1, the quantity of water required for construction of the facility would represent approximately a 0.08-percent increase over the projected No Action groundwater usage. Withdrawal of this additional quantity should not impact groundwater availability. Operating the facility at NTS would require 56.8 million l/yr (15 million gal/yr), which is approximately 2.4 percent of the projected No Action groundwater usage. This additional withdrawal represents less than 0.2 percent of the estimated annual recharge. Minimal impacts to groundwater availability are expected.

Construction and operation of a MOX fuel fabrication facility would not result in direct discharges to groundwater. Treated wastewater discharged to disposal ponds, however, could percolate downward into the groundwater of the Valley-Fill Aquifer. This water would be monitored prior to discharge and would not be discharged until contaminant levels were within the limits specified in the State of Nevada permit. Impacts to groundwater quality are, therefore, not expected. In addition, other factors contributing to a lessening of potential impacts to groundwater are the combined effects of a deep water table, low discharge volumes, and high evaporation rates.

Idaho National Engineering Laboratory

Surface Water. No surface water would be withdrawn for any construction or operation activities associated with the facility; groundwater would be used as the water source for a MOX fuel fabrication facility. Therefore, there would be no impacts to surface water availability.

[Text deleted.]

During construction of a MOX fuel fabrication facility, sanitary wastewater (1.9 million l/yr [0.5 million gal/yr]) would be generated and discharged to the existing wastewater treatment system at the ICPP Area. This amount would represent a 0.4-percent increase in the effluent discharged at INEL. During operation, a maximum of approximately 43.5 million l/yr (11.5 million gal/yr) of sanitary and other wastewater would be discharged to this wastewater treatment system. This amount represents a 8.1-percent increase in INEL's annual effluent. After treatment, all wastewater generated during construction and operation would be available to recycle or would then be allowed to evaporate to the atmosphere, and/or infiltrate to the subsurface. All discharges would be monitored to comply with discharge requirements.

Water from heating the facility would be recycled to the heating unit. Steam plant blowdown would be discharged through the sanitary wastewater system. Steam condensate from heating, condensation from air conditioning, and other distillates would be monitored for radioactivity and, if uncontaminated, discharged to infiltration/evaporation ponds or to local drainage channels. Fire sprinkler water and truck hosedown water would be collected, monitored, sampled, and treated as process wastewater, when required. It would be monitored for radioactivity and, if uncontaminated, discharged to local drainage channels or evaporation/ infiltration ponds.

The potential location for a MOX fuel fabrication facility is not located in an area historically prone to flooding, but is within the flood zone that could occur as a result of the failure of the MacKay Dam during a maximum probable flood. This flood event would be more critical than either the 100- or 500-year flood. Because INEL is in a region where flash floods could occur, the facilities would be designed to withstand such flooding.

Groundwater. All water required for construction and operation would be supplied from groundwater from the Snake River Plain Aquifer. As shown in Table 4.3.5.1.4–1, construction and operation water requirements for the facility (1.9 million l/yr [0.5 million gal/yr]), and 56.8 million l/yr (15 million gal/yr), respectively, would represent 0.03- and 0.8-percent increases over the projected annual groundwater usage. These withdrawals would increase the total projected amount to be pumped at INEL to 17.6 percent of the total allotment during construction and 17.7 percent of the allotment during operation. As discussed in Section 3.4.4, a groundwater allotment not to exceed 43,000 million l/yr (11,360 million gal/yr), has been negotiated by DOE with the Idaho Department of Water Resources (DOE 1991c:4-73). These additional withdrawals would not impact groundwater availability.

Construction and operation of a MOX fuel fabrication facility would not result in direct discharges to groundwater. Treated wastewater that is discharged to disposal ponds but does not evaporate, however, could percolate downward toward the groundwater of the Snake River Plain Aquifer. This water would be monitored and would not be discharged until contaminant levels were within the limits specified. Impacts to groundwater quality are, therefore, not expected. In addition, other factors contributing to a lessening of potential impacts to groundwater are the combined effects of a deep water table, low discharge volumes, and high evaporation rates.

Pantex Plant

Surface Water. No surface water would be withdrawn for any construction or operation activities associated with the facility; groundwater would be used as the water source for the MOX fuel fabrication facility. Therefore, there would be no impacts to surface water availability.

[Text deleted.]

During construction of a MOX fuel fabrication facility, sanitary wastewater (1.9 million l/yr [0.5 million gal]) would be generated and discharged to the existing wastewater treatment systems north of Zone 12. During operation, a maximum of approximately 43.5 million l/yr (11.5 million gal/yr) of sanitary wastewater and other wastewater would be discharged to either of these wastewater treatment systems. After treatment, all wastewater generated during construction and operation would be discharged to the playa lakes or would be available for

recycle. In 1994, Pantex averaged approximately 1.4 million l/day (370,000 gal/day) of wastewater discharged to the playas. This quantity is expected to decrease in the future. The expected quantity of additional wastewater potentially discharged to the playas during operation (0.12 million l/day [31,704 gal/day]) should not cumulatively cause any exceedances of the monthly average limit of 2.46 million l/day (0.65 million gal/day).

Water from heating the facility would be recycled to the heating unit. Steam plant blowdown would be discharged through the sanitary wastewater system. Steam condensate from heating, condensation from air conditioning, and other distillates would be monitored for radioactivity and, if uncontaminated, discharged to local drainage channels or the playas. Fire sprinkler water and truck hosedown water would be collected, monitored, sampled, and treated as process wastewater, when required. It would be monitored for radioactivity and, if uncontaminated, available for recycle or discharged to local drainage channels or the playas.

The potential site for the MOX fuel fabrication facility would be located in Zone 11. Since no 100-year, 500-year, or standard project flood boundaries have been delineated in Zone 11, there would be no impacts to floodplains. However, flooding in other areas of Pantex could occur due to the runoff associated with precipitation and ponding in local playas (LLNL 1988a:XVI).

Groundwater. All water required for construction and operation would be supplied from groundwater using the existing supply system which obtains water from the Ogallala aquifer or possibly from the Hollywood Road Wastewater Treatment Plant. Construction water requirements for a MOX fuel fabrication facility would be small relative to the recoverable water in aquifer storage which for the year 2010 was estimated to be 287 trillion l (76 trillion gal) (PX WDB 1993a:1). As shown in Table 4.3.5.1.4–1, construction of the facility would require 1.9 million l/yr (0.5 million gal/yr) of water, which represents approximately a 0.8-percent increase over Pantex's projected annual groundwater usage and would be approximately 0.1 percent of the capacity of the groundwater system (1,900 million l/yr [502 million gal/yr]). Water required for operations would increase projected water requirements for Pantex by 5.1 percent. Previous studies have shown that, when the Amarillo City Well Field pumped 18.5 billion l/yr (4.9 billion gal/yr) from the Ogallala aquifer, an average of 1.8-m/yr (5.9-ft/yr) decline in the water table occurred over a 10-year period in the local well field area. This water level decline caused a shift in the groundwater flow direction beneath Pantex. Operating the facility at Pantex would require 56.8 million l/yr (15 million gal/yr), resulting in a small drawdown representing approximately 2.9 percent of the available groundwater. Although this additional groundwater withdrawal would add to the existing decline in water levels of the Ogallala Aquifer, the estimated degree is not substantial. The total groundwater withdrawal including this facility would be 305 million l/yr (80.9 million gal/yr) which, because of expected cutbacks in other programs, would be 63 percent less than what is currently being withdrawn (836 million l/yr [221 million gal/yr]) from wells at Pantex.

Construction and operation of a MOX fuel fabrication facility would not result in direct discharges to groundwater. Treated wastewater discharged to playas, however, could percolate downward into the groundwater of the near surface aquifer. This water would be monitored and would not be discharged until contaminant levels were within the limits specified by the TNRCC. [Text deleted.]

Although the expected drawdowns caused by withdrawing the water required for this alternative are small, the overall decline in groundwater levels in the Amarillo area is of concern. Possible groundwater conservation measures at Pantex that could be considered including decreasing research farm irrigation demands through dry farming, installing dripless faucets, and process water reuse. In addition, to alleviate some of the effects from pumping groundwater from the Ogallala Aquifer, the city of Amarillo is considering supplying treated wastewater to Pantex from the Hollywood Road Wastewater Treatment Plant for industrial use. However, details of this measure have not been determined.

Oak Ridge Reservation

Surface Water. Water required for construction and operational of a MOX fuel fabrication facility would be provided via existing distribution systems. The source of this water is the Clinch River and its tributaries. During construction, the quantity of water required would be approximately 1.9 million l/yr (0.5 million gal/yr), which would represent a 0.01-percent increase over the projected no action annual surface water withdrawal. During operation, water requirements would be approximately 56.8 million l (15 million gal) annually. This represents a 0.4-percent increase in the projected annual surface water withdrawal for ORR. These additional water withdrawals from the Clinch River should cause minimal impacts to surface water availability.

During construction of the MOX fuel fabrication facility, sanitary wastewater (approximately 1.9 million l/yr [0.5 million gal/yr]) would be generated and discharged to the existing wastewater treatment system in the Y–12 area. This would cause a less than 1-percent increase in the effluent from the Y–12 area. During operation, a total of 43.5 million l/yr (11.5 million gal/yr) of wastewater would be generated by the facility. This would cause a 1.9-percent increase in the effluent discharged from the Y–12 area. All discharges would be monitored to comply with discharge requirements. No impacts would be expected. Fire sprinkler water and truck hosedown water would be collected in tanks, monitored for radioactivity, and then transferred by pipeline or tanker to treatment facilities as required. Uncontaminated water would be pumped to storm drains.

Since the MOX fuel fabrication facility would be located outside both the 500- and 100-year floodplains no impact to floodplains is expected.

Groundwater. No groundwater would be used for any project-related water requirements and no wastewater would be discharged directly to groundwater; therefore, neither groundwater quality nor availability would be affected.

Savannah River Site

Surface Water. No surface water withdrawals would be made; groundwater would be used for construction and operation of a MOX fuel fabrication facility. During construction of a MOX fuel fabrication facility, sanitary wastewater (approximately 1.9 million l/yr [0.5 million gal/yr]) would be generated and discharged to the sitewide wastewater treatment system, which would not require any modification. This amount would represent a 0.3-percent increase in the estimated annual flow to this system and could be handled within the existing capacity. During operation, a total of 43.5 million l/yr (11.5 million gal/yr) of wastewater would be generated by the facility, representing a 6.2-percent increase for SRS. This additional quantity would represent approximately 0.9 percent of the Fourmile Branch's minimum flow. [Text deleted.]

Cooling system blowdown is another non-hazardous wastewater stream generated by this facility. The facility would release approximately 0.04 million l (11,200 gal) of treated blowdown water over an 8-hour period, 250 days/yr. All discharges to surface waters would be monitored to comply with discharge requirements.

Fire sprinkler water and truck hosedown water would be collected in tanks, monitored for radioactivity, and then transferred by pipeline or tanker to treatment facilities as required. Uncontaminated water would be pumped to storm drains.

The potential location of a MOX fuel fabrication facility would be located outside the 100-year floodplain. Information on the location of the 500-year floodplain boundary could be developed in future environmental studies.

Groundwater. During construction, the quantity of water required would be approximately 1.9 million l/yr (0.5 million gal/yr), which would represent a 0.01-percent increase over the existing projected annual groundwater withdrawal. During operation, water requirements would be approximately 56.8 million l/yr

(15 million gal/yr) and would represent a 0.4-percent increase in groundwater withdrawals. Minimal impacts to groundwater availability are expected. No wastewater would be discharged directly to groundwater; therefore, groundwater quality should not be affected.

Generic Site

Utilizing an existing fuel fabrication facility should not cause any impacts to water resources outside of those identified in the site-specific environmental impact statements which have been prepared for these facilities. There would be no noticeable changes to current use of water resources. The facilities would continue to obtain raw water from either surface or groundwater sources which have an adequate supply to support them. Wastewater would continue to be treated, monitored, and discharged under permit requirements.

[Text deleted.]